Engineering Interpretations

Soil Features

This table gives estimates of several important soil features which are used in land use planning that involves engineering considerations. Soil features which are covered include bedrock depth and hardness, cemented pan depth and hardness, subsidence, potential frost action, and risk of corrosion for uncoated steel or for concrete.

DEPTH TO BEDROCK - This value is given if bedrock is with a depth of 60 inches. The depth is based on many soil borings and observations made during soil mapping. The rock is specified as either soft or hard. If the rock is soft, excavations can be made with trenching machines, backhoes, or small rippers. If the rock is hard or massive, blasting or special equipment generally is needed for excavation.

CEMENTED PAN - Cemented pan is a nearly continuous layer of indurated or strongly cemented material having a hard, brittle consistency because the particles are held together by cementing substances such as, calcium carbonate, or oxides of silicon, iron, or aluminum. These layers are identified when they occur within a depth of 60 inches. Pans are classified as "thin" or "thick." "Thin" cemented pans are thin enough so that excavations can be made with trenching machines, backhoes, or small rippers and other equipment common to construction of pipelines, sewer lines, cemeteries, and the like. "Thick" cemented pans are sufficiently thick or massive to require blasting or special equipment beyond which is considered normal in excavating for this type of construction.

SUBSIDENCE - Subsidence potential is the maximum possible loss of surface elevation from the drainage of wet soils having organic layers or semi-fluid mineral layers. Estimates of the depth of subsidence (in inches) that takes place soon after drainage (initial subsidence) and after oxidation (total subsidence) are given for soils that are likely to subside.

POTENTIAL FROST ACTION - This is the likelihood of upward or lateral movement of soil by the formation of segregated ice lenses (frost heave) and the subsequent loss of soil strength upon thawing. The following classes are used in regions where frost action is a potential problem: (1) Low -- soils are rarely susceptible to the formation of ice lenses, (2) Moderate -- soils are susceptible to the formation of ice lenses, resulting in frost heave and subsequent loss of soil strength, and (3) High -- soils are highly susceptible to the formation of ice lenses, resulting in frost heave and subsequent loss of soil strength.

RISK OF CORROSION - Various metals and other materials corrode when on or in the soil, and some metals and materials corrode more rapidly when in contact with specific soils than when in contact with others. Corrosivity ratings are given for two of the common structural materials, uncoated steel and concrete. The risk of corrosion classes are low, moderate, and high.

This subsection includes:

- **(a) Soil Features**

Table 24.--Soil Features

(See text for definitions of terms used in this table. Absence of an entry indicates that the feature is not a concern or that data were not estimated.)

Map symbol and soil name	Restrictive layer				Potential for frost action	Risk of corrosion	
	Kind	Depth to top	Thickness	Hardness		Uncoated steel	Concrete
		In	In				
40000:							
Barden	---	---	---	---	None	High	Moderate
40011:							
Barco	Bedrock (lithic)	20-40	---	---	None	Low	Moderate
40015:							
Eldorado	---	---	---	---	None	High	Moderate
40016:							
Eldorado	---	---	---	---	None	High	Moderate
40017:							
Maplegrove	---	---	---	---	None	High	High
40018:							
Medoc	---	---	---	---	None	High	Moderate
40019:							
Newtonia	---	---	---	---	None	Moderate	Moderate
Eldorado	---	---	---	---	None	High	Moderate
40020:							
Newtonia	---	---	---	---	None	Moderate	Moderate
Eldorado	---	---	---	---	None	High	Moderate
40021:							
Opolis	---	---	---	---	None	High	Moderate
Hepler	---	---	---	---	None	High	Moderate
40022:							
Opolis	---	---	---	---	None	Moderate	Moderate
40023:							
Opolis	---	---	---	---	None	Moderate	Moderate
40024:							
Opolis	---	---	---	---	None	High	Moderate
40026:							
Sylvania	Bedrock (paralithic)	40-60	---	---	None	Low	Moderate
40027:							
Sylvania	Bedrock (paralithic)	40-60	---	---	None	Low	Moderate
40028:							
Sylvania	Bedrock (paralithic)	40-60	---	---	None	Low	Moderate
40029:							
Sylvania	Bedrock (paralithic)	40-60	---	---	None	Low	Moderate

Table 24.--Soil Features--Continued

Map symbol and soil name	Restrictive layer				Potential for frost action	Risk of corrosion	
	Kind	Depth to top	Thickness	Hardness		Uncoated steel	Concrete
		In	In				
44000:							
Cherokee	---	---	---	---	None	High	Moderate
44002:							
Carl	---	---	---	---	None	High	Moderate
44004:							
McCune	---	---	---	---	None	High	Moderate
46001:							
Verdigris	---	---	---	---	None	Low	Low
46002:							
Hepler	---	---	---	---	None	High	Moderate
46004:							
Osage	---	---	---	---	None	High	Moderate
46005:							
Verdigris	---	---	---	---	None	Low	Low
70006:							
Creldon	Fragipan	18-35	6-30	Noncemented	Moderate	High	High
70012:							
Hoberg	Fragipan	20-36	11-35	Noncemented	Moderate	Moderate	High
70045:							
Keeno	Fragipan	18-36	6-30	Noncemented	Moderate	Moderate	High
70056:							
Crackerneck	---	---	---	---	None	Moderate	High
70057:							
Crackerneck	---	---	---	---	None	Moderate	High
70058:							
Crackerneck	Bedrock (lithic)	>60	---	---	None	Moderate	High
70059:							
Goss	---	---	---	---	None	Moderate	Moderate
70060:							
Hoberg	---	---	---	---	None	Moderate	High
Eldorado	---	---	---	---	None	High	Moderate
Pomme	---	---	---	---	None	Moderate	Moderate
70061:							
Pomme	---	---	---	---	None	Moderate	Moderate
70062:							
Pomme	---	---	---	---	None	Moderate	Moderate
Rueter	---	---	---	---	None	Low	High
70063:							
Rueter	---	---	---	---	None	Low	High
70064:							
Rueter	---	---	---	---	None	Low	High

Table 24.--Soil Features--Continued

Map symbol and soil name	Restrictive layer				Potential for frost action	Risk of corrosion	
	Kind	Depth to top	Thickness	Hardness		Uncoated steel	Concrete
		In	In				
70065:							
Rueter	---	---	---	---	None	Low	High
70066:							
Winnipeg	---	---	---	---	None	Moderate	Moderate
71751:							
Bearthicket	---	---	---	---	None	Moderate	Moderate
73031:							
Gerald	Fragipan	20-40	15-36	Noncemented	High	High	High
75376:							
Cedargap	---	---	---	---	Moderate	Low	Low
99000.							
Pits and Quarries							
99001.							
Water							
99002.							
Borrow areas							
99003.							
Miscellaneous water							
99005.							
Landfill							
99010:							
Dumps.							
Pits	Bedrock (lithic)	0	---	---	---	---	---
99011:							
Kanima	---	---	---	---	None	Moderate	Low